



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/849,799	05/04/2001	G. Glenn Henry	CNTR:2052	8830

23669 7590 05/18/2004
HUFFMAN LAW GROUP, P.C.
1832 N. CASCADE AVE.
COLORADO SPRINGS, CO 80907-7449

EXAMINER

MEONSKE, TONIA L

ART UNIT	PAPER NUMBER
----------	--------------

2183

DATE MAILED: 05/18/2004

4

Please find below and/or attached an Office communication concerning this application or proceeding.

SK

Office Action Summary

Application No.

09/849,799

Applicant(s)

HENRY ET AL.

Examiner

Tonia L Meonske

Art Unit

2183

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
2. On page 1, Applicant has incorporated six co-pending US Patent Applications by reference without identifying the applications with a serial number. Please amend the specification to reference the US Patent Applications by serial number.
3. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
6. Claim 22 contains the trademark/trade name x86. Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe an

Art Unit: 2183

instruction set architecture employed by Intel microprocessors and, accordingly, the identification/description is indefinite.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 2, 15-21, 23-40, 43, 44, 45, 48, 50 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Emma et al., US Patent 5,353,421.

9. Referring to claim 1, Emma et al. have taught a branch prediction apparatus in a processor including address selection logic for providing a fetch address to an instruction cache, the fetch address used to select lines of the instruction cache, the apparatus comprising:

- a. first and second branch predictors, for providing first and second target address predictions of a branch instruction to the address selection logic (abstract, Figure 10, elements 12 and 55, column 4, lines 1-44);
- b. instruction decode logic, configured to receive and decode said branch instruction and to generate a type thereof (abstract, Figure 10, element 17); and
- c. branch control logic, configured to control the address selection logic to select said first prediction as the fetch address, said first prediction selecting a first line of the instruction cache (Figure 10, abstract, column 4, lines 1-44, column 7, lines 3-12);
- d. wherein said branch control logic is further configured to subsequently selectively control the address selection logic, based on said branch instruction type, to select said

second prediction as the fetch address, said second prediction selecting a second line of the instruction cache (Figure 10, abstract, column 4, lines 1-44, column 5, lines 35-68, column 17, lines 25-55).

10. Referring to claim 2, Emma et al. have taught the apparatus of claim 1, as described above, and further comprising:

a. comparison logic, coupled to said first and second branch predictors, for comparing said first and second target address predictions (Figure 10, abstract, column 17, lines 39-45, column 9, lines 20-65).

11. Referring to claim 15, Emma et al. have taught the apparatus of claim 2, as described above, and wherein said type includes a specification of whether said branch instruction is a conditional type branch instruction (column 11, lines 18-58).

12. Referring to claim 16, Emma et al. have taught the apparatus of claim 15, as described above, and wherein said branch control logic controls the address selection logic to select said second target address prediction if said branch instruction type is a conditional branch instruction and said first and second predictions miscompare (column 11, lines 18-58, column 13, line 65-column 14, line 14).

13. Referring to claim 17, Emma et al. have taught the apparatus of claim 15, as described above, and wherein said first and second predictors provide first and second direction predictions of said conditional branch instruction to said branch control logic for predicting whether said conditional branch instruction will be taken (column 11, line 66-column 12, line 30).

14. Referring to claim 18, Emma et al. have taught the apparatus of claim 17, as described above, and further comprising:

Art Unit: 2183

- a. second comparison logic, coupled to said first and second branch predictors, for comparing said first and second direction predictions of said conditional branch instruction (Figure 10, abstract, column 17, lines 39-45, column 9, lines 20-65).
15. Referring to claim 19, Emma et al. have taught the apparatus of claim 18, wherein said branch control logic controls the address selection logic to select an instruction pointer of a next sequential instruction to said conditional branch instruction as the fetch address if said second direction prediction predicts said conditional branch instruction will not be taken (column 12, lines 16-30).
 16. Referring to claim 20, Emma et al. have taught the apparatus of claim 19, as described above, and wherein said branch control logic controls the address selection logic to select said next sequential instruction pointer if said second direction prediction predicts said conditional branch instruction will not be taken and said first and second direction predictions miscompare (column 12, lines 16-30).
 17. Referring to claim 21, Emma et al. have taught the apparatus of claim 2, as described above, and wherein said branch control logic subsequently selectively controls the address selection logic based on said branch instruction type to select said second prediction as the fetch address if said first and second predictions do not match (Figure 10, abstract, column 4, lines 1-44, column 5, lines 35-68, column 17, lines 25-55).
 18. Referring to claim 23, Emma et al. have taught the apparatus of claim 1, as described above, and wherein said first branch predictor receives the instruction cache fetch address and provides said first target address prediction in response to the fetch address (abstract, Figure 10, column 7, lines 3-32).

Art Unit: 2183

19. Referring to claim 24, Emma et al. have taught the apparatus of claim 23, as described above, and wherein said first branch predictor provides said first target address prediction in response to the fetch address whether or not a branch instruction is present in a third line of the instruction cache, said third instruction cache line selected subsequent to selection of said first instruction cache line (abstract, column 17, lines 39-55).

20. Referring to claim 25, Emma et al. have taught the apparatus of claim 23, as described above, and wherein said first branch predictor provides said first target address prediction prior to said instruction decode logic decoding said branch instruction (abstract, column 4, line 1-44).

21. Referring to claim 26, Emma et al. have taught the apparatus of claim 1, as described above, and wherein said first branch predictor comprises a branch target address cache indexed by the instruction cache fetch address (column 7, line 54-column 8, line 22).

22. Referring to claim 27, Emma et al. have taught the apparatus of claim 1, as described above, and wherein said first branch predictor comprises a speculative call/return stack (column 8, lines 23-55).

23. Claim 43 does not recite limitations above the claimed invention set forth in claim 15 and is therefore rejected for the same reasons set forth in the rejection of claim 15 above.

24. Claims 28, 29, 30, 33, 34, 35, 36, 39, 40, and 45 do not recite limitations above the claimed invention set forth in claims 1 and 2 and are therefore rejected for the same reasons set forth in the rejection of claims 1 and 2 above.

25. Referring to claim 31, Emma et al. have taught the apparatus of claim 28, as described above, and wherein said second branch predictor comprises a branch history table for providing a

Art Unit: 2183

direction prediction in said second prediction, said direction prediction for predicting whether said branch instruction will be taken or not taken (Figure 10, element 12).

26. Referring to claim 32, Emma et al. have taught the apparatus of claim 28, as described above, and wherein if said branch type is a conditional branch type, said comparison logic compares first and second direction predictions in said first and second predictions, respectively (column 11, line 66-column 12, line 30).

27. Referring to claim 37, Emma et al. have taught the processor of claim 36, as described above, and further comprising:

- a. an instruction cache, coupled to an address bus for receiving a fetch address, said fetch address selecting a line of instructions for provision to said instruction decode logic (Figure 10, elements 13, 11, 16, and 17).

28. Referring to claim 38, Emma et al. have taught the processor of claim 37, as described above, and wherein said speculative branch predictor makes said speculative prediction even though a possibility exists that no branch instruction is present in said line of instructions (column 7, line 53-column 8, line 22, A prediction is always made for each instruction. A miss in the BHT predicts the next sequential instruction.).

29. Claim 44 does not recite limitations above the claimed invention set forth in claims 1, 2, and 31 and is therefore rejected for the same reasons set forth in the rejection of claim 1, 2, and 31 above.

30. Claim 48 does not recite limitations above the claimed invention set forth in claims 1, 2, 15, and 16 and is therefore rejected for the same reasons set forth in the rejection of claim 1, 2, and 15, and 16 above.

Art Unit: 2183

31. Claim 50 does not recite limitations above the claimed invention set forth in claims 1, 2, 15, 17, 18, and 19 and is therefore rejected for the same reasons set forth in the rejection of claims 1, 2, 15, 17, 18, and 19 above.

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

33. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Emma et al., US Patent 5,353,421.

34. Referring to claim 22, Emma et al. have taught the apparatus of claim 1, as described above. Emma et al. have not specifically taught wherein said branch instruction type comprises an x86 branch instruction type. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the branch instructions of Emma et al. be implemented as any type of branch instruction, including an x86 branch instruction, for the desirable purpose of implementing and benefiting from this invention in a widely used instruction set.

35. Claims 3, 4, 5, 41, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emma et al., US Patent 5,353,421, in view of Gochman et al., US Patent 5,964,868.

36. Referring to claim 3, Emma et al. have taught the apparatus of claim 2 as described above. Emma et al. have not specifically taught wherein said type includes a specification of whether said branch instruction is a return type branch instruction. However, Gochman et al.

Art Unit: 2183

have taught wherein said type includes a specification of whether said branch instruction is a return type branch instruction (Gochman et al., Column 4, line 8-column 5, line 18, column 2, lines 17-28) for the desirable purpose of implementing the speculative return stack buffer so that instructions can continue to be fetched while a main memory access occurs. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the type of Emma et al., include a specification of whether said branch instruction is return type branch instruction, as taught by Gochman et al., for the desirable purpose of being able to implement the speculative return stack buffer so that instructions can continue to be fetched while a main memory access occurs (Gochman et al., Column 4, line 8-column 5, line 18, column 2, lines 17-28).

37. Referring to claim 4, Emma et al. in combination with Gochman et al. have taught the apparatus of claim 3, as described above, and wherein said branch control logic controls the address selection logic to select said second target address prediction if said branch instruction type is a return instruction and said first and second predictions miscompare (Gochman et al., column 7, lines 1-37, Emma et al., column 17, lines 13-5).

38. Referring to claim 5, Emma et al. in view of Gochman et al. have taught the apparatus of claim 4, as described above, and wherein said second branch predictor comprises a call/return stack for providing said second target address prediction of said return instruction (Gochman et al., Column 4, line 8-column 5, line 18, column 2, lines 17-28).

39. Claim 41 does not recite limitations above the claimed invention set forth in claim 3 and is therefore rejected for the same reasons set forth in the rejection of claim 3 above.

Art Unit: 2183

40. Claim 47 does not recite limitations above the claimed invention set forth in claims 1-4 and is therefore rejected for the same reasons set forth in the rejection of claims 1-4 above.

41. Claims 6-14, 42, 46, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emma et al., US Patent 5,353,421, in view of Rappoport et al., US Patent 6,601,161.

42. Referring to claim 6, Emma et al. have taught the apparatus of claim 2, as described above. Emma et al. have not specifically taught wherein said type includes a specification of whether said branch instruction is a program counter-relative type branch instruction. Rappoport et al. have taught said type includes a specification of whether said branch instruction is a program counter-relative type branch instruction (Rappoport et al., column 9, line 50-column 10, line 42, column 2, lines 1-12) so that the predictor that predicts indirect branches, or program counter-relative branches, most accurately is used. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the type of Emma et al., include a specification if whether said branch instruction is an program counter-relative branch type instruction as taught by Rappoport et al. for the desirable purpose of using the predictor that most accurately predicts program counter-relative branches (Rappoport et al., column 9, line 50-column 10, line 42, column 2, lines 1-12).

43. Referring to claim 7, Emma et al. in combination with Rappoport et al. have taught the apparatus of claim 6, as described above, and wherein said branch control logic controls the address selection logic to select said second target address prediction if said branch instruction type is a program counter-relative branch instruction and said first and second predictions miscompare (Rappoport et al., line 50-column 10, line 42).

Art Unit: 2183

44. Referring to claim 8, Emma et al. have taught the apparatus of claim 7, as described above, and wherein said second branch predictor comprises an arithmetic unit for calculating said second target address prediction based on an instruction pointer of said branch instruction (column 11, lines 1-17).

45. Referring to claim 9, Emma et al. have taught the apparatus of claim 8, as described above, and wherein said arithmetic unit calculates said second target address prediction using said instruction pointer of said branch instruction (column 11, lines 1-17).

46. Referring to claim 10, Emma et al. have taught the apparatus of claim 2, as described above. Emma et al. have not taught wherein said type includes a specification of whether said branch instruction is a direct type branch instruction. However, Rappoport et al. have taught wherein said type includes a specification of whether said branch instruction is a direct type branch instruction (Rappoport et al., column 9, line 10-column 10, line 66) for the desirable purpose of using the predictor that will most likely predict the direct branch correctly. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the type of Emma et al, includes a specification of whether said branch instruction is a direct type branch instruction, as taught by Rappoport et al. for the desirable purpose of using the predictor that will most likely predict the direct branch correctly.

47. Referring to claim 11, Emma et al. have taught the apparatus of claim 10, as described above, and wherein said branch control logic controls the address selection logic to select said second target address prediction if said branch instruction type is a direct branch instruction and said first and second predictions miscompare (column 13, line 67-column 14, line 14).

Art Unit: 2183

48. Referring to claim 12, Emma et al. have taught the apparatus of claim 2, as described above. Emma et al. have not specifically taught wherein said type includes a specification of whether said branch instruction is an indirect type branch instruction. However, Rappoport et al. have taught wherein said type includes a specification of whether said branch instruction is an indirect type branch instruction (Rappoport et al., column 9, line 50-column 10, line 42) so that the predictor that predicts indirect branches most accurately is used. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the type of Emma et al., include a specification if whether said branch instruction is an indirect branch type instruction as taught by Rappoport et al. for the desirable purpose of using the predictor that most accurately predicts indirect branches (Rappoport et al., column 9, line 50-column 10, line 42).

49. Referring to claim 13, Emma et al. in view of Rappoport et al. have taught the apparatus of claim 12, as described above, and wherein said branch control logic controls the address selection logic not to select said second target address prediction if said branch instruction type is an indirect branch instruction (Rappoport et al., line 50-column 10, line 42).

50. Referring to claim 14, Emma et al. have taught the apparatus of claim 13, as described above, and wherein said second branch predictor comprises a branch target buffer for caching branch target addresses of previously executed indirect branch instructions (Rappoport et al., line 50-column 10, line 42).

51. Claims 42 and 46 do not recite limitations above the claimed invention set forth in claims 1, 2, 6, and 7 and is therefore rejected for the same reasons set forth in the rejection of claims 1, 2, 6, and 7 above.

Art Unit: 2183

52. Claim 49 does not recite limitations above the claimed invention set forth in claims 1, 2, 12, 13, and 14 and is therefore rejected for the same reasons set forth in the rejection of claims 1, 2, 12, 13, and 14 above.

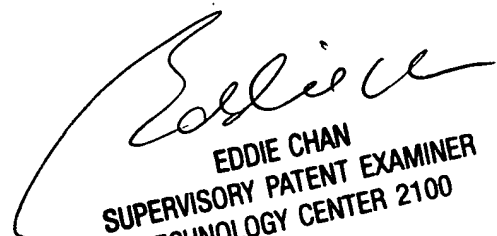
Conclusion

53. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tonia L Meonske whose telephone number is (703) 305-3993. The examiner can normally be reached on Monday-Friday, 8-4:30.

54. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie P Chan can be reached on (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

55. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tlm


EDDIE CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100